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Dated 16 July 1999

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Request for grant of a patent

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The Patent Office

Cardiff Road
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Fee: £25

1. Your reference

39487.GB

2. Patent application number
(The Patent Office will fill in this part)

2 JUL 1998 9814395.1

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Mars U.K. Limited
3D Dundee Road
Slough
Berkshire
SL1 4LG
United Kingdom

Patents ADP number *(if you know it)*

5632260001

If the applicant is a corporate body, give the country/state of incorporation

United Kingdom

4. Title of the invention

BLOOD CHUNKS

5. Full name, address and postcode in the United Kingdom to which all correspondence relating to this form and translation should be sent

Reddie & Grose
16 Theobalds Road
LONDON
WC1X 8PL

Patents ADP number *(if you know it)*

91001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application *(If you know it)*	Date of filing *(day/month/year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day/month/year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

YES

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document.

Continuation sheets of this form	
Description	5
Claim(s)	2
Abstract	
Drawing(s)	3 +3

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	ONE
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature [signature] Date 2 July 1998

12. Name and daytime telephone number of person to contact in the United Kingdom

N S MARLOW
0171-242 0901

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Notes

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BLOOD CHUNKS

The present invention relates to the preparation of a novel edible chunk comprising blood, and to the chunk itself.

Blood and blood fractions are used in the manufacture of pet foods as a nutrient. In particular, the hæmoglobin fraction of whole blood is employed; by the hæmoglobin fraction is meant the residue from whole blood once the plasma, or most of the plasma, has been removed. The hæmoglobin fraction consists of red and white blood cells with a residue of plasma. The hæmoglobin fraction typically contains from about 14% to 40% protein and about 35% to 45% red blood cells. The remainder is mainly water together with other blood components.

Conventionally, whole blood is heated by scraped surface heating or steam infusion to 75°C and treated with hydrogen peroxide to decolour it. The decoloured blood is dewatered to give a powder. In alternative techniques, whole blood is coagulated with for example a solution containing calcium ions and the resulting coagulate cut into chunks. Such chunks are homogeneous in texture, resembling liver.

It has now been found that if the hæmoglobin fraction is heated and treated with hydrogen peroxide a solid foam results. The foam reaction product can be cut into chunks and incorporated into, for example, pet food. If the foam reaction product is compressed, a textured solid mass is produced. The compressed solid mass has an internal texture similar to that of cooked meat.

According to the invention there is provided a method of forming a blood chunk comprising heating a hæmoglobin fraction of blood (as defined above)and treating the heated hæmoglobin fraction with hydrogen peroxide. The reaction

product is advantageously then compressed submitting the treated hæmoglobin fraction to pressure.

Preferably the hydrogen peroxide is added to the hæmoglobin fraction at at least 0.5% by weight. There does not appear to be a significant upper limit to the concentration of hydrogen peroxide in the reaction mixture which is effective to cause the desired reaction to take place; concentrations of up to 3% (by weight) have been found satisfactory.

Preferably, compression is carried out at a temperature greater than 60°C.

Preferably the hæmoglobin fraction is heated to between 60°C and 80°C before addition of the hydrogen peroxide.

Preferably the hæmoglobin fraction comprises at least about 10%, more preferably at least about 15%, by weight protein. At lower protein concentrations, the reaction product does not absorb all the water present in the reaction mixture. Such products are useful and their manufacture falls within the scope of the present invention; however, it will usually be necessary to remove the proteinaceous material from the unabsorbed water before it is used.

Additives may be included in the hæmoglobin fraction to modify the nutritional content and flavour of the chunks. It is preferred that the pH of hæmoglobin fraction is no less than 4, and that it is no greater than 9.

The foamed reaction product of hæmoglobin and hydrogen peroxide can be used as it is. As has already been stated, it can be compressed to give a product having a laminar texture. The compression can be carried out on the reaction product as it is formed, or the reaction product can be stored and then subjected to heating, for example by microwave radiation, prior to compressing. Alternatively,

the reaction product may be steamed to give a product having a jelly-like texture. The steaming can be carried out with meat juices or other flavoured aqueous media to impart particular flavours to the product.

The product can be dried, preferably at about 60°C, to produce hard, crunchy chunks, which are useful as a dry pet food.

The pressure at which the reaction product of hæmoglobin and hydrogen peroxide is compressed to achieve the laminar internal structure is not critical; a pressure of up to about 400 kPa is preferred.

Also according to the invention there is provided a solid foam comprising a major proportion of blood protein.

Also according to the invention there is provided an edible chunk comprising a major amount of blood protein and having a fibrous, laminar internal structure.

The invention will be further described, by way of example, with reference to the drawings in which;

Figure 1 shows schematically a method according to a first embodiment of the invention;

Figure 2 shows schematically a method according to a second embodiment of the invention; and

Figure 3 shows schematically a method according to a third embodiment of the invention.

The methods according to the invention shown in the drawings include the following common features. The hæmoglobin fraction of blood is pumped from a tank 10 by a peristaltic pump 12 to a steam infuser 14 where the hæmoglobin is heated

to about 75°C. The heated hæmoglobin passes from the steam infuser 14 to a high shear mixer reactor 16, such as a Dispax reactor. In the Dispax reactor, the hæmoglobin is reacted with hydrogen peroxide pumped from a hydrogen peroxide tank 18 by a hydrogen peroxide pump 20. In the reactor 16, the hæmoglobin and the hydrogen peroxide are mixed efficiently. Preferably, the reactor is a high shear, low volume mixer to ensure adequate mixing of the two components.

In the first embodiment of the invention, shown in Figure 1, the foam reaction product 22 is deposited in a tray 24. The reaction product 22 can be allowed to be compressed by its own weight, in which case the solid mass produced is elastic and can be cut up to provide elastic chunks. Alternatively, pressure can be applied to the reaction product 22 in the tray by application of a pressure plate 26. On release of the pressure plate a solid product 28 having a fibrous, laminar internal structure is produced, which can then be cut into chunks 30 as at 32.

In the second embodiment of the invention, shown in Figure 2, the reaction product 22 from the reactor 16 is passed to a piston pump 40 in which the reaction product is compressed. As the reaction product 22 leaves the piston pump 40, it is diced as at 42 to produce chunks 44 having a fibrous, laminar internal structure.

In the third embodiment of the invention, shown in Figure 3, the reaction product 22 leaves the reactor 16 through a disperser 50, from where it passes into a mouth formed by the widely separated ends of two converging continuous belts 52, 44. The reaction product is compressed between the two continuous belts, and the resulting solid sheet 56 is cut into chunks 58 as it leaves the continuous belts 52, 54, as at 60. Again, the chunks produced have a fibrous, laminar internal structure.

The chunks have a fibrous, laminar internal structure, similar to that of meat chunks, so that the chunks can be readily used in canned food stuffs such as pet foods to provide a protein source which is analogous in appearance and texture to meat.

CLAIMS

1. A method of manufacturing a blood chunk comprising: heating a hæmoglobin fraction of blood (as herein defined) and adding hydrogen peroxide.

2. A method according to claim 1 further comprising compressing the reaction product of the hæmoglobin fraction and the hydrogen peroxide.

3. A method according to claim 2 in which the compression is carried out at a temperature greater than 60°C.

4. A method according to claim 2 or 3 in which the compressed product is dried.

5. A method according to any preceding claim further comprising steaming the reaction product of the hæmoglobin fraction and the hydrogen peroxide.

6. A method according to any preceding claim in which the hydrogen peroxide is added to the hæmoglobin fraction at at least 0.5% (by weight).

7. A method according to any preceding claim in which the hæmoglobin fraction is heated to between 60°C and 80°C before addition of the hydrogen peroxide.

8. A method according to any preceding claim in which the hæmoglobin fraction comprises at least 10%, preferably at least 15%, protein by weight.

9. A solid foam comprising a major proportion of blood protein.

10. An edible chunk comprising a major proportion of blood protein and having a fibrous, laminar internal structure.

11. A method substantially as described.

12. A chunk substantially as described.

Fig. 1

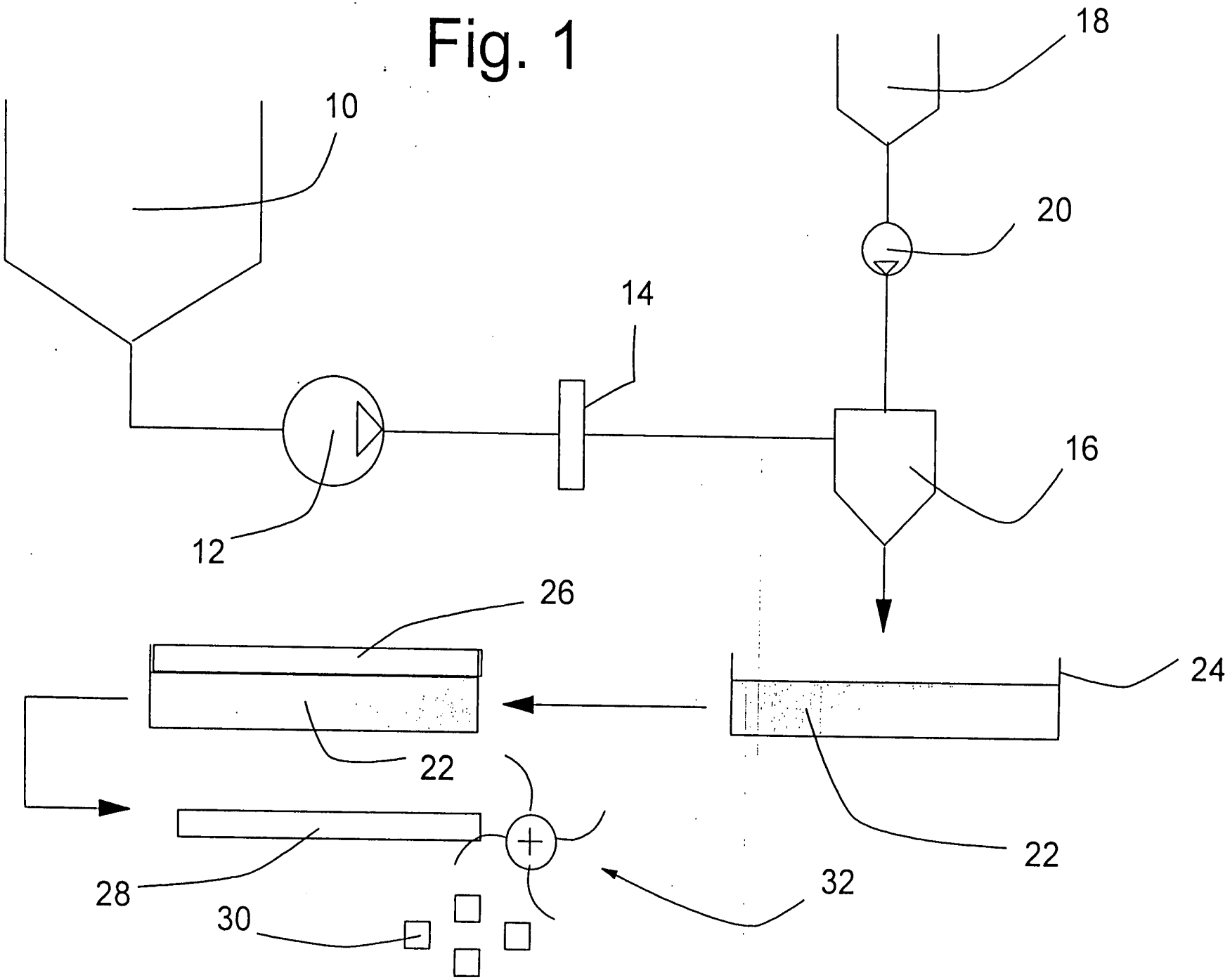


Fig. 2

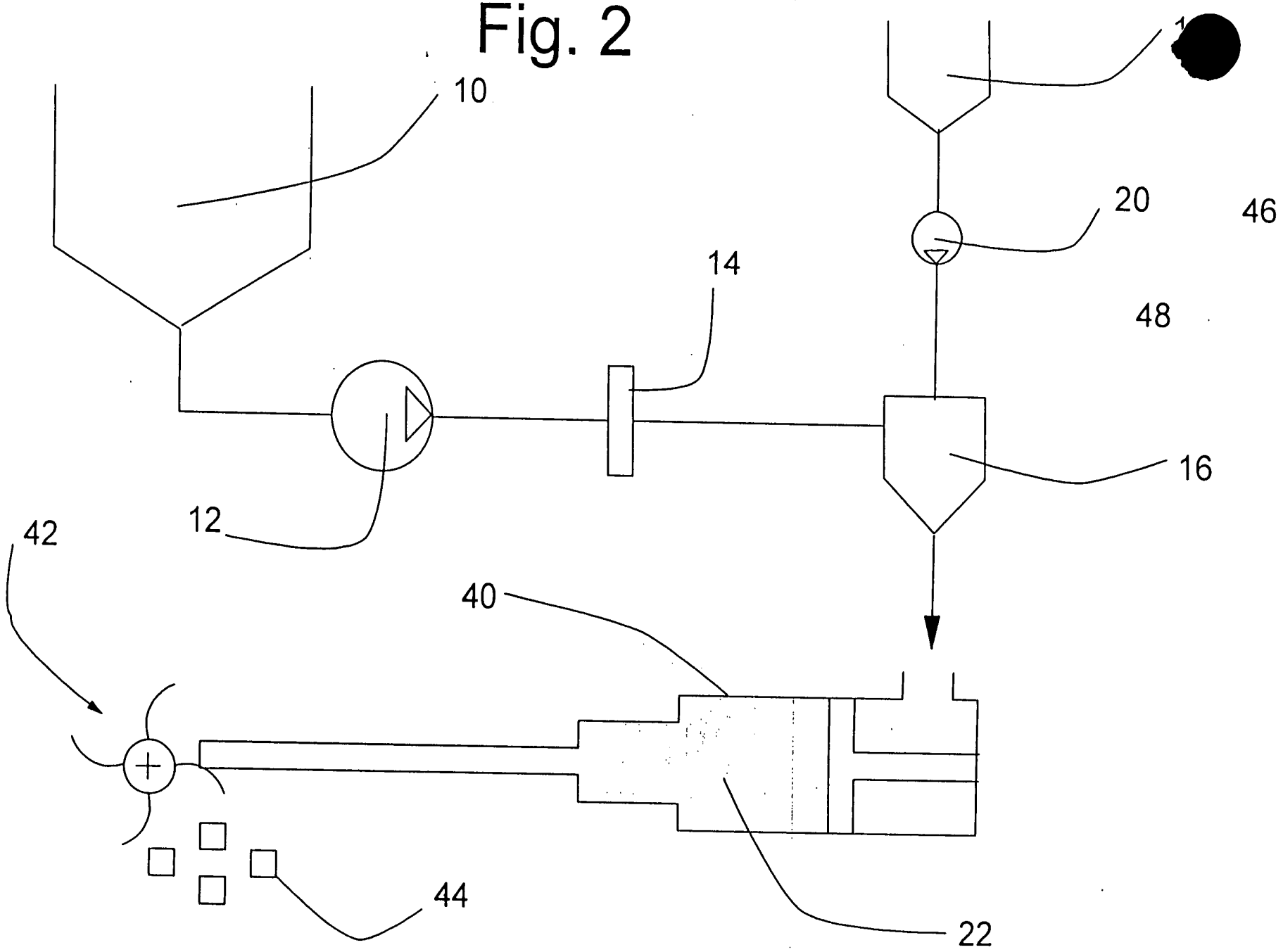
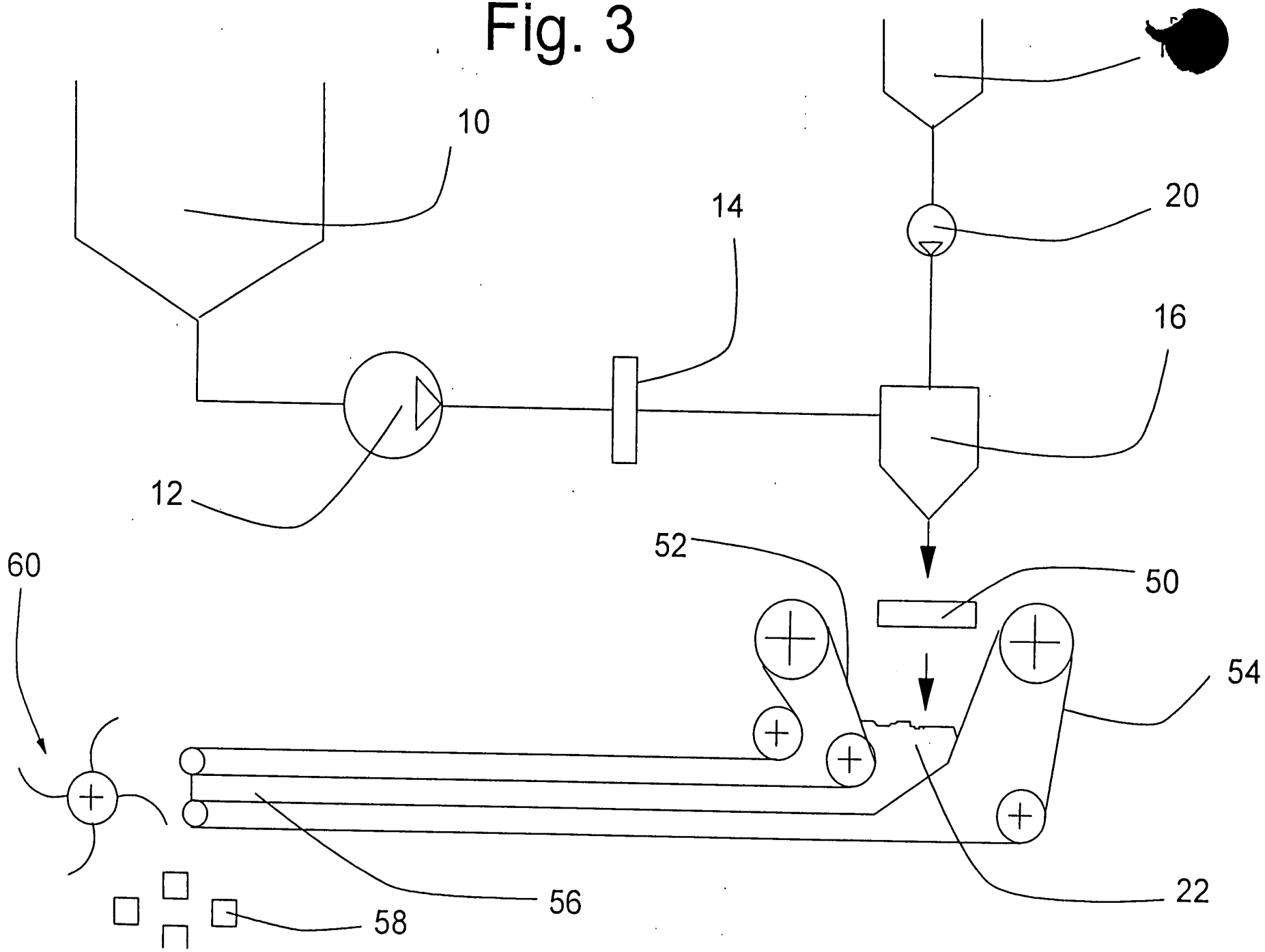


Fig. 3



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